

Concern	Tools	System Status		Priority
		Historic	IA Baseline WQCP	
Yearling salmon migrants Oct-Jan	• Increase inflow	12,000	12,000	A
	• Reduce export	6000	8000	
Winter run survival Dec-Mar	• Close DCC	Closed Nov	Closed Dec-Jan	A
	• Increase inflow	>20000	20000	
	• Reduce export	3000-9000	11,000 allowed	
	• Close DCC	Closed	Closed	
Delta Smelt Adults Jan-Mar	• Reduce export	8000-5000	11000 Feb, 8000 Mar	A
Steelhead Feb-May	• Reduce export	5000-10,000	8000-10000	A if wild
X2 Feb - June	• Increase inflow • Reduce export	Similar to regs in Feb-Apr, 85 in May	75-80 May and June	OK
Salmon Fry Feb-Mar				OK
DS Young Apr-Jul	• X2 placement	83 in May - similar to regs in June	75-80 May June	B >>>> A (M-J)/B (Jul) >>>>
San Joaquin smolts Apr-Jun	• Reduce exports	4000	1500	A
	• Reduce exports	8000 April, 3000 May	4450	
	• Increase SJ flow	3000 April, 2000 May	4450	
	• Close HOR	Open	closed	
Striped Bass Young May-Aug	• X2 placement			C
	• Increase Sac flow			
Splittail May-Jul	• Reduce exports			OK

NEW GAME 1A

General Discussion

- Game with monthly adjustments with DWRSIM and DAILY OPS.
- Two DWRSIM models run on month one - D1485 and WQCP
- Then compare two runs for changes in reservoirs, flows, and deliveries.
- Two objectives: effectiveness of new assets + allocation of remaining b(2) assets

Assumptions:

1. Starting reservoirs: 1981 output from DWRSIM Study 4 - seven values input to two year run of DWRSIM single year run mode.
2. CALCULATE end of year conditions for two studies to get major part of b(2) cost.
3. Part of Stanislaus flow to meet VAMP flows should be a b(2) cost. Other river flows to meet VAMP flows are not a b(2) cost.
4. Two studies have different water quality objectives, but the WQCP study includes water quality objectives that are part of ACCORD costs. Vernalis water quality costs are in ACCORD.

1981 water year GAME 1A:

- Total export achieved with D1485 study is 5514 TAF - as compared to WQCP study with 4900 TAF = resulting in 614 TAF reduction of exports.
- Note storage is high after 1980 and there is export capacity through the summer if upstream storage is requested to provide further exports to San Luis before the end of the water year.
- CVP and SWP share VAMP exports reductions in WQCP study 50/50. CVP share is 283 TAF of the reduced exports.
- In WQCP study reservoirs were down 360 TAF (even without further releases) from WQCP requirements.
- San Luis is down 226 TAF. Not counted because already in export cost.
- Delivery costs?? Delivered 375 TAF less than D1485.
- IMAF of water supply effects due to WQCP. All CVP. Impacts of upstream AFRP and VAMP are included as b(2) costs.
- 470 TAF of upstream AFRP b(2) upstream cost for Keswick AFRP releases. 2000 cfs extra releases for AFRP for October through January.
- Model exports are 4.7-4.9 MAF under WQCP versus about 150 TAF more under D1485 - so total impact is relatively small.
- Appears that 1981 has all b(2) used by upstream and WQCP actions.
- No further actions available in 1981 for Scenario 1A.

OLD GAME 1A

1981:

1. Baseline 4700 TAF of exports with DWRSIM conditions. - includes Accord costs for CVP only - 400 TAF charged to b(2) account for WQCP + 200 TAF for VAMP + 100 TAF from Stanislaus + 50 TAF from Folsom.
2. DWRSIM was run for D1485 and D1485+Accord - difference is Accord cost - input this into Daily
3. Develop new baseline 4.7 DAILY OPS vs 4.9 MAF DWRSIM. DWRSIM should reduce exports in OCT and June by a total of 200 TAF.
4. Allocation process?
5. Options for water supply - gw and source shifting plus purchases. To get us through low point.

Fall

1. More exports thus higher chlorides 100>>200-250 mg/l

2. Reduce outflow - lower than historic with greater exports
3. JPOD allows higher exports (e.g. 2000 cfs in Nov)
4. Withdrawing from storage
5. Folsom had to raise releases to meet AFRP
6. Keswick was at AFRP
7. **Start Issue:** reducing exports causes chlorides to rise - should we allow that or keep outflow higher?
8. **Action:** close DCC in Nov and Dec (note model predicts no effect on WQ from closing DCC).
9. **Conflict:** close DCC will increase chlorides above 200 mg/l. Limiting closure to 2 weeks. Use of JPOD limits fish actions like DCC closure.
10. **Action:** reduce exports in first two weeks in Nov to 5000 cfs 40TAF and one week in Dec. No water cost because SL filled in Dec.
11. Pumped less in Nov and more in Dec total hit about 60 TAF but SL filled so no EWA cost - unsure as to whether b(2) would be charged.
12. B(2) upstream account costs through Jan 60-70 TAF at Folsom (from WQCP/AFRP), no cost at Shasta. 74 TAF total b(2) account at end of January.
13. **Model accounting problem:** Adjusted Folsom release is not in Delta inflow.
14. **Effect:** some effect on Trinity storage. Losing some hydro at Spring Creek by releasing to Clear Creek
15. Can't save water upstream.
16. Effect on DS fall mwt index from higher fall exports?

Winter (FEB-MAR)

1. SL is still full.
2. Demands remain controlling with SL full. Low exports
3. Smelt do not appear to be a concern: smelt had high index. Adult smelt salvage moderate under historic moderate export rates. Unchanged.
4. Salmon are a concern for week at end of Feb: **Action:** 50 fish per TAF trigger for export reduction on salvage density. Cuts export by 50%.
5. Steelhead also a concern: **Action:** combine with salmon action of 50 trigger. Used 5000 limit to simulate this.
6. Chlorides are low - no WQ issue.

Spring (APR-JUN)

1. **Action:** take out Amer Riv flow augmentation in May (1000 cfs) - no longer an AFRP priority.
2. **Action:** 5000 cfs limit on exports before VAMP.
3. **Action:** 45 day VAMP (through May) - SWP also took a hit but CVP provided water from SL. How to make this up? 225+ TAF upstream + 350 TAF Delta hit?
4. Q: How do we account for SWP losses at 1500 export limit..
5. **Action:** adjust releases on Amer River. Then release more Folsom water in June to export.
6. **Action:** also adjust Feather and Keswick releases during VAMP export reductions. BACKUP in reservoirs only up to release requirements. Drop Oroville releases by 2000 cfs in May increased in June by 2000 - same for Keswick. Inflows to Delta thus adjusted - Lower May and higher June inflows.
7. In June any release can be exported 100%.
8. Accumulated cost to b(2) about 250 TAF by end of May.
9. **Action:** June export limit of 3000 cfs. For both delta smelt and striped bass. Reducing exports requires reconsidering reservoir releases.
10. **Action:** HOR closed april and May.
11. Improved X2 in April-June.

Summer (July-Sept)

1. Effort for striped bass depend on availability of water. Already benefitted from May-June export reductions.

2. Considerable b(2) water available.
3. **Remaining Concerns:** High salvage of striped bass and smelt in July left unchallenged, but may have been alleviated by our earlier actions.
4. **Action:** raise summer export limits to 7100.
5. **Action:** adjust summer releases from reservoirs up - 100 % of water to export because flow governing not E/I.
6. **Action:** cap Keswick releases at 15000 cfs.

Total

- In-Delta b(2) cost ~ 382 TAF. Total of 682 for b(2).
- Water Supply cost = 200 TAF from b(2) - WQCP also cost 200 TAF (100 to b(2)). Net 125 TAF water supply hit from D1485. 100 % deliveries for CVP were not possible.
- Did well because we started with full SL and left SL a little better than WQCP because of extra expanded Banks.
- Shasta down by 60 and Folsom down by 100 TAF.
- Reduced salvage 33-46 % of chinook - less on other species. Smelt and striped bass were reduced in spring a lot but made up with higher July-Sept, which may not be real at least for smelt because of spring actions.

New 1B - 1981

1. Accord cost 640 TAF of which 320 TAF is assumed to be b(2) cost.
2. Upstream AFRP first - high storage levels thus go for enhancing fall flows.
3. American River - b(2) options for October and January to get flows up to AFRP - cost of 150 TAF.
4. Stanislaus was zero cost.
5. Total upstream b(2) at 350 TAF limit because reservoirs did not spill by Jan 31. The 200 TAF cost was only a cost because Shasta storage capacity was raised.
6. Delta Wetlands filled in DEC and JAN and released to export in summer (205 TAF benefit to water supply).
7. Note: EWA would be a good backup to lesson burden on b(2) from upstream actions.
8. With balance of 130 TAF of b(2) likely that we would have chosen to do VAMP in April (e.g., VAMP export reductions) - Note in reality VAMP decision would occur before the final accounting on WQCP is available, plus more releases from reservoirs could have made up export deficits in the summer. VAMP cost of 125 TAF.
9. Two weeks early filling of San Luis because of upstream AFRP releases.
10. San Luis at 500 TAF end-of-year.

Additional game steps:

- 1) Add in the upstream b(2) releases to Delta inflows in fall and winter. This would provide additional benefits to fish in the Delta.
- 2) Add in-Delta storage - benefit deliveries? (About 200 TAF of yield.)

Additional Notes:

- Full deliveries but DAILY OPS had 200 TAF less San Luis Storage because overestimates of deliveries and exports with DWRSIM.
- Big pumps were seldom used.
- Some water would be put in gw bank.
- Issue: assume water could be used to service demand but may not be able to rely on it for allocations - Bacon is easy - Webb and Shasta water are more questionable but probably supportable.
- Expanded Banks = 50 TAF WS benefit
- Delta Wetlands = 200-240 TAF
- 240 water supply benefit in deliveries + 60 benefit from demand shift + 140 low point benefit in San Luis = total 300 increase in deliveries + 140 carryover benefit in San Luis (option for groundwater recharge).
- All deliveries were made.